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Scorpions from the Mitaraka Massif in French Guiana. II. Description of a new species of *Ananteris* Thorell, 1891 (Scorpiones: Buthidae)



Scorpions du Massif du Mitaraka en Guyane française. II. Description d'une nouvelle espèce d'Ananteris Thorell, 1891 (Scorpiones : Buthidae)

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ABSTRACT

A new remarkable species belonging to the genus *Ananteris* Thorell, 1891 (Buthidae) is described from the Mitaraka Massif in French Guiana, a site located near the borders of French Guiana, Brazil, and Suriname. The description of this new species brings further evidence about the biogeographic patterns of distribution presented by most species of the genus *Ananteris*, which are highly endemic in most biogeographic realms of South America, including the Tepuys and Inselberg Massifs.

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R É S U M É

Une remarquable nouvelle espèce appartenant au genre *Ananteris* Thorell, 1891 (Buthidae) est décrite du massif du Mitaraka, en Guyane française, région située dans la zone frontalière entre cette dernière, le Brésil et le Surinam. La description de la nouvelle espèce apporte un nouvel appui aux modèles de distribution géographique présentés par la majorité des espèces appartenant au genre *Ananteris*, fortement endémiques dans la plupart des régions biogéographiques de l'Amérique du Sud, y compris dans les massifs des Tepuys et des Inselbergs.

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Fig. 1. Aerial view of French Guiana rainforest in the region of the Mitaraka Massif.
Photo © Xavier Desmier.

1. Introduction

As outlined in a recent publication [1], until the early 1980s the scorpion fauna of French Guiana did not particularly call the attention of experts, and the few publications devoted to this fauna were limited to an isolated description [2] or to monographic compilations [3,4]. The first framework dedicated to the scorpion fauna of French Guiana was the one by Lourenço [5], in which all the species known to that date were treated. Many subsequent publications followed on the scorpion fauna

of French Guiana, including some dealing with soil species [6]; however, very few studies were dedicated to the French Guiana Massifs represented by Inselbergs (Figs. 1–2). For a general overview on Tepuys and Inselbergs as possible palaeoclimate refugia and/or endemic centres, the reader may refer to Lourenço [1].

The description of a new species of *Ananteris* from the Haut Ouarimapan, in the extreme southwest of French Guiana [7], represented the first contribution to the faunas of Inselbergs in this department. Moreover, even if the studies on the French Guiana scorpion fauna are far from

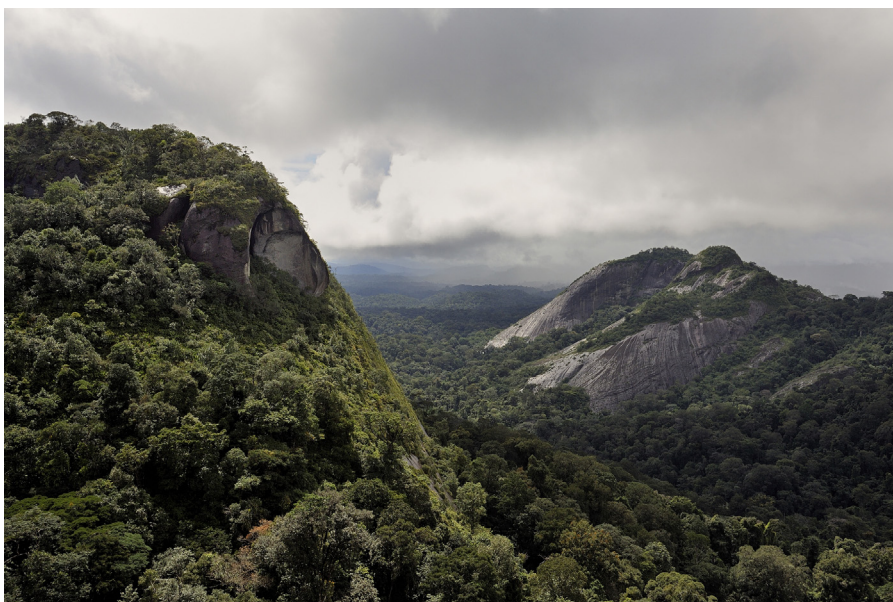


Fig. 2. Aerial view of the Massif of Mitaraka.
Photo © Xavier Desmier

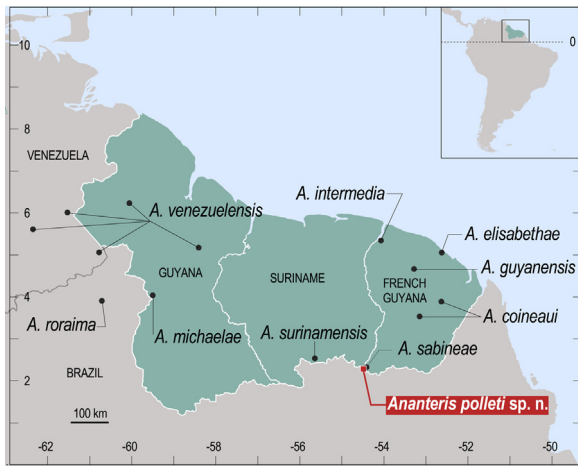


Fig. 3. Map of the Guayana Floristic Province with the known distribution of the *Ananteris* species.
Map Lucienne Wilmé.

being complete, this region appears as one of the ‘hot-spots’ for biodiversity in South America. The degree of endemism for the scorpion species present in the region can overpass 70% [8,9].

During the ‘Our Planet Reviewed’ Guyane-2015 expedition to the Mitaraka Massif in French Guiana, several scorpions were collected, among which two interesting specimens belonging to a new species of *Ananteris*. The Mitaraka Massif is a site located near the borders of French Guiana, Brazil, and Suriname (Fig. 3). These very small

specimens were obtained with the use of extraction methods, and represent the second species of *Ananteris* found in this massif. The description of this new species brings further evidence about the biogeographic patterns of distribution presented by most species of the genus *Ananteris*, which are highly endemic in most biogeographic realms of South America, including the Tepuys and Inselberg massifs.

2. The genus *Ananteris* Thorell in the ‘Guayana Region’ and in French Guiana in particular

After the creation of the genus *Ananteris* Thorell, 1891 and the description of *Ananteris balzanii* Thorell, 1891, from the State of Mato Grosso in Brazil [10], the group remained inconspicuous by the number of species (three), and this until the 1970s. Nevertheless, the number of new species described within the genus steadily increased after its revision by Lourenço [11].

In recent years, only a rather limited number of species were described from the ‘Guayana Region’ [12]. Besides, most of the described species were from French Guiana [5,7,11,13,14], with a few exceptions from Brazil, Guyana, and Suriname [15–17]. The pace of descriptions from the Guyana region was much less intense than in other regions, mainly because the inventory work with the area is practically non-existent.

The species previously described from French Guiana are: *Ananteris coineau* Lourenço, 1982, *Ananteris guyanensis* Lourenço & Monod, 1999, *Ananteris sabineae* Lourenço, 2001, *Ananteris elisabethae* Lourenço, 2003 and *Ananteris intermedia* Lourenço, 2012 [6,7,11,13,14]. Other species also described from the ‘Guayana Region’ are



Fig. 4. Moist rainforest, habitat of *Ananteris polleti* sp. n.
Photo © Marc Pollet.



Fig. 5. Collection of samples from 'white water traps' in the field.
Photo © Xavier Desmier.

Ananteris roraima Lourenço & Duhem, 2010 from the Brazilian State of Roraima [17], *Ananteris surinamensis* Lourenço, 2012 from Suriname, *Ananteris michaelae* Lourenço, 2013 from Guyana and *Ananteris venezuelensis* González-Sponga, 1972 from Venezuela and Guyana [15,16,18] (Fig. 3). The description of a new species brings the total number of known *Ananteris* species described from the 'Guayana Region' to ten.

3. Methods

The scorpions were collected in the moist rainforest (Fig. 4) with the use of white water traps which are dug slightly into the soil or litter layer so that their upper rim reaches the surface (Fig. 5). The fixative used in site 1 was formaline 10% with detergent; in site 2, because of severe rainfall, salty water with detergent was used. Traps were serviced by pouring the yields through a small-mesh plastic sieve and gently transferring them (with a painter's brush) into a whirlpack and adding a 90% alcohol solution. In the lab, all invertebrate specimens were extracted in the usual way (M. Pollet, in litt.).

Illustrations and measurements were produced using a Wild M5 stereo-microscope with a drawing tube and an ocular micrometer. The measurements follow Stahnke [19] and are given in mm. Trichobothrial notations follow Vachon [20] and morphological terminology mostly follows Vachon [21] and Hjelle [22].

4. Taxonomic treatment

Family Buthidae C. L. Koch, 1837

Genus *Ananteris* Thorell, 1891

Ananteris polleti sp. n. (Figs. 6–8)

Type material: French Guiana, Mitaraka, 'La Planète revisitée-MNHN/PNI Guyane 2015 (APA 973-1)', (02°13'59.1" N, 54°26'37.9" W), 433 m, tropical moist forest—in plateau, 2/III/2015–8/III/2015 (M. Pollet), male holotype; (02°14'17.8" N, 54°27'08.2" W), 352 m, tropical moist forest—in slope, 25/II/2015–3/III/2015, (M. Pollet), male paratype. Material deposited in the 'Muséum national d'histoire naturelle', Paris.

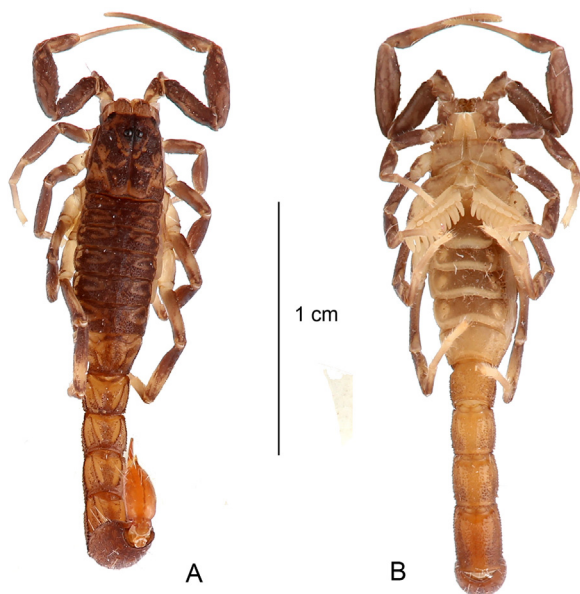


Fig. 6. *Ananteris polleti* sp. n. Habitus of the male holotype. A–B. Dorsal and ventral aspects.



Fig. 7. *Ananteris polleti* sp. n. Male holotype. A–B. Latero-dorsal and latero-ventral aspects. C. Metasoma, lateral aspect. D. Ventral aspect showing coxapophysis, sternum, genital operculum and pectines.

Etymology: The specific name honours Marc Pollet (Research Institute for Nature and Forest, INBO, Brussels) who collected the type material.

Diagnosis: Species of very small size compared to the average size of the other species within the genus (14.66 mm in total length for male holotype; see morphometric values after the description). General coloration yellow to brownish-yellow, intensely marked with dark brown variegated spots. Pedipalps moderately short; fingers with six rows of granules; holotype and paratype pectines small with 11–11 and 12–12 teeth, respectively.

Carinae and granulation moderately to strongly marked; dorsal and latero-dorsal carinae on metasomal segments II to IV with 3–4 posterior spinoids granules. Trichobothriotaxy, type A-β-beta.

Relationships: mainly by its diminutive size, aspects of the pigmentation pattern, and small pectines with a reduced number of teeth, the new species shows affinities with *Ananteris festae* Borelli, 1899 and *Ananteris cisandinus* Lourenço, 2015. These two species are respectively known only from Ecuador and the Amazonian/cis-Andean region of Peru. From the other species of the Guyana region, the

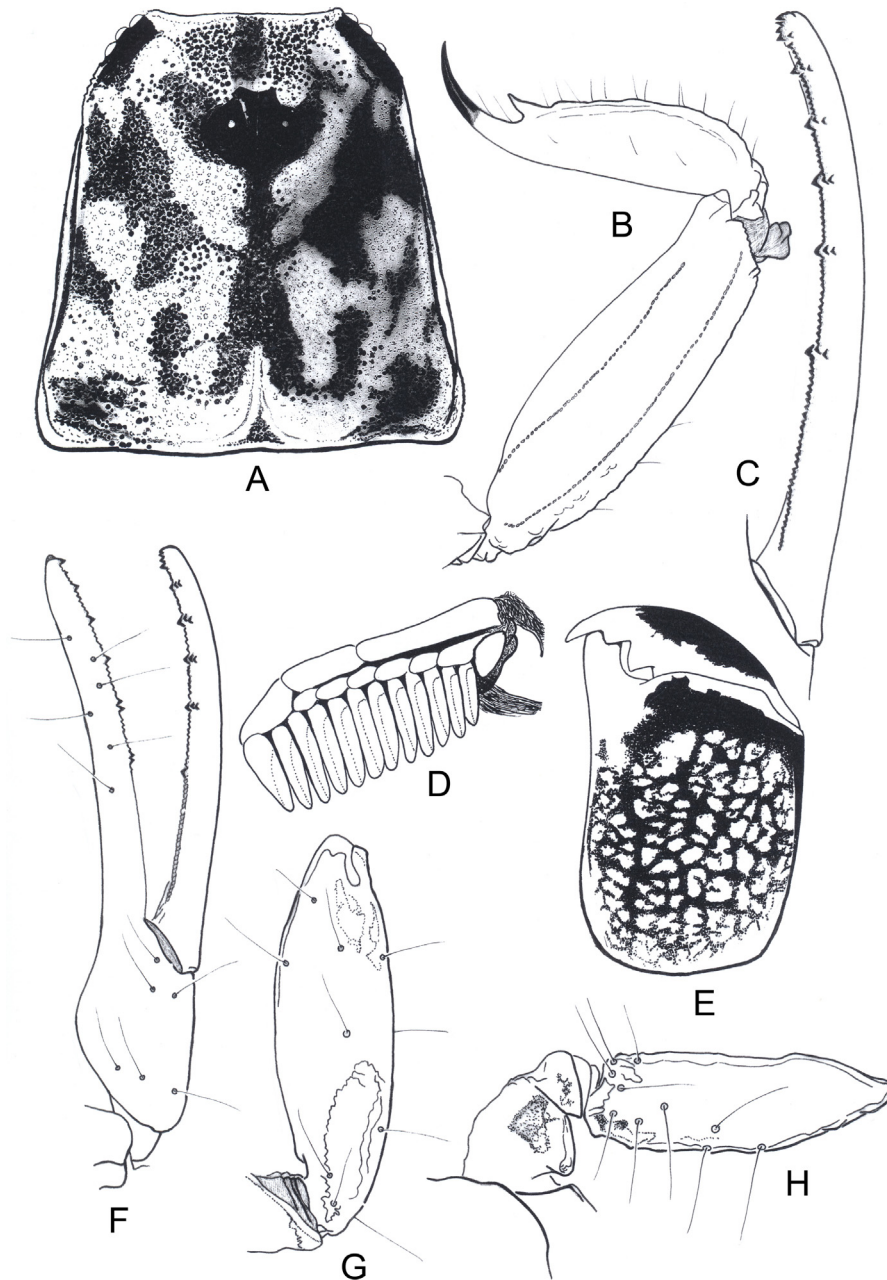


Fig. 8. *Ananteris polleti* sp. n. Male holotype. A. Carapace. B. Metasomal segment V and telson, lateral aspect. C. Cutting edge of movable finger, showing rows of granulations. D. Pecten. E. Chelicera showing characteristic variegated pigmentation. F–H. Trichobothrial pattern. F. Chela, dorso-external aspect. G. Patella, dorsal aspect. H. Femur, dorsal aspect.

new species can be distinguished by a combination of characters: (i) very diminutive size, (ii) small pectines with only 11 to 12 teeth in males, (iii) dorsal and latero-dorsal carinae on metasomal segments II to IV with 3–4 posterior spinoid granules. It differs from the only other *Ananteris* species also known from the Mitaraka Massif, *A. sabineae*, by the presence of an intense variegated pigmentation on the chelicerae (absent from *A. sabineae*), and by only 11–12 teeth on the pectines vs. 20 in *A. sabineae*.

Description based on the male holotype and the male paratype (morphometric measurements after the description).

Coloration. Generally yellow to brownish-yellow with brown to dark brown variegated pigmented zones on the carapace, the tergites, and the appendages. Prosoma: carapace yellow with dark brown spots on anterior, lateral and posterior edges; eyes surrounded by black pigment. Mesosoma yellow with confluent brownish zones on

posterior and lateral edges of tergites. Metasomal segments I to V yellow; all segments marked with diffused brown spots. Vesicle yellow marbled with light brown zones; base of aculeus yellow, tip reddish. Venter yellow to pale yellow; coxapophysis and sternites infuscate. Chelicerae yellow with variegated blackish spots over the entire surface; fingers with blackish spots; teeth yellow. Pedipalps yellow; femur, patella, and chela strongly marked with dark brown spots; chela hand and fingers dark brown. Legs yellow, intensely marked with dark brown spots.

Morphology. Carapace with moderately to strongly marked granulation; anterior margin almost straight. Anterior median superciliary and posterior median carinae weak or absent. All furrows moderate to weak. Median ocular tubercle distinctly anterior to the centre of carapace; median eyes separated by approximately one ocular diameter. Three pairs of reduced lateral eyes. Sternum subpentagonal. Mesosoma: tergites with moderately to strongly marked granulation, similar to that of carapace. Median carina moderately to weakly marked on all tergites. Tergite VII pentacarinat. Venter: genital operculum divided longitudinally, each plate more or less suboval in shape. Pectines small: pectinal tooth count 11–11 in male holotype (12–12 in male paratype); basal middle lamellae of pectines not dilated; fulcra absent. Sternites smooth; only VII slightly granular; spiracles rather short; setation moderate; sternite VII with very weakly marked carinae and granulation. Metasomal segments I to III with 10 carinae, crenulate; segment IV with 8 carinae, crenulate; segment V slightly rounded and smooth, with vestigial carinae; intercarinal spaces moderately granular on all segments; dorsal and latero-dorsal carinae on segments II to IV with 3–4 posterior spinoid granules. Telson elongate and smooth; aculeus short and weakly curved; subaculear tooth strongly marked and spinoid. Cheliceral dentition characteristic of family Buthidae [23]; fixed finger with two strong basal teeth; movable finger with two vestigial basal teeth; ventral surface of both finger and manus with long, dense setae. Pedipalps: femur pentacarinat; patella and chela with weak to vestigial carinae; internal face of patella with only vestigial spinoid granules; all faces weakly granular, almost smooth. Fixed and movable fingers with 6, almost linear, rows of granules; two small external and one internal accessory granule present at the base of each row; three granules at the extremity of the fingers. Trichobothriotaxy; orthobothriotaxy A-β-beta [20,24]. Legs: Tarsus with very numerous, fine, median setae ventrally. Tibial spurs strongly developed on legs III and IV.

Morphometric values (in mm) of the male holotype. Total length including telson, 14.66. Carapace: length, 1.87; anterior width, 1.13; posterior width, 1.73. Mesosoma length, 3.47. Metasomal segments. I: length, 0.93; width, 1.07; II: length, 1.00; width, 1.10; III: length, 1.13; width, 1.13; IV: length, 1.33; width, 1.13; V: length, 2.53; width, 1.27; depth, 0.93. Telson length, 2.40; width, 0.73; depth, 0.67. Pedipalp: femur length, 1.63, width, 0.53; patella length, 1.87, width, 0.60; chela length, 2.47, width, 0.43, depth, 0.50; movable finger length, 1.80.

Disclosure of interest

The author declares that he has no competing interest.

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References

- [1] W.R. Lourenço, Scorpions from the Mitaraka Massif in French Guiana; description of one new genus and species (Scorpiones: Chactidae), C. R. Biologies 339 (2016) 141–146.
- [2] E. Simon, Études arachnologiques. 6^e mémoire. X. Arachnides nouveaux ou peu connus, Ann. Soc. Entomol. Fr. 5 (7) (1877) 225–242.
- [3] K. Kraepelin, Scorpiones und Pedipalpi, in: F. Dahl (Ed.), Das Tierreich. Herausgegeben von der Deutschen zoologischen Gesellschaft, 8, R. Friedländer und Sohn Verlag, Berlin, 1899, pp. 1–265.
- [4] C. Mello-Leitão, Escorpiões sul-americanos, Arq. Mus. Nac. 40 (1945) 7–468.
- [5] W.R. Lourenço, La faune des scorpions de Guyane française, Bull. Mus. natn. Hist. nat. Paris 5 (1983) 771–808.
- [6] W.R. Lourenço, Humiculous scorpions: on the genera *Ananteris* Thorell, 1891 and *Microananteris* Lourenço, 2004 (Scorpiones: Buthidae), with the description of a new species from French Guiana, C. R. Biologies 335 (2012) 555–561.
- [7] W.R. Lourenço, Description of a new species of *Ananteris* (Scorpiones, Buthidae) from the south of French Guyana, Zootaxa 23 (2001) 689–693.
- [8] W.R. Lourenço, La « Province » biogéographique guyanaise ; étude de la biodiversité et des centres d'endémisme en vue de la conservation des patrimoines génétiques, C. R. Soc. Biogeogr. 67 (1991) 113–131.
- [9] W.R. Lourenço, Scorpion diversity in Tropical South America: Implications for conservation programs, in: P. Brownell, G.A. Polis (Eds.), Scorpion biology and research, Oxford University Press, 2001, pp. 406–416.
- [10] T. Thorell, Nova species Brasiliana ordinis Scorpionum, Entom. Tidskrift 12 (1891) 65–70.
- [11] W.R. Lourenço, Révision du genre *Ananteris* Thorell, 1891 (Scorpiones, Buthidae) et description de six espèces nouvelles, Bull. Mus. natl. Hist. nat. Paris 4 (1982) 119–151.
- [12] S.A. Mori, The Guayana lowland floristic Province, C. R. Soc. Biogeogr 67 (1991) 67–75.
- [13] W.R. Lourenço, The genus *Ananteris* Thorell (Scorpiones, Buthidae) in French Guyana, Rev. Iber. Aracnol. 7 (2003) 183–188.
- [14] W.R. Lourenço, L. Monod, A new species of *Ananteris* Thorell from French Guyana (Scorpiones, Buthidae), Rev. Suisse Zool. 106 (1999) 301–306.
- [15] W.R. Lourenço, The genus *Ananteris* Thorell, 1891 (Scorpiones, Buthidae) in the Guyanas region with a description of a new species from Suriname, Entomol. Mitt. Zool. Mus. Hamburg 16 (2012) 41–47.

- [16] W.R. Lourenço, The genus *Ananteris* Thorell, 1891 (Scorpiones, Buthidae) in the Guyana's region and description of a new species from Guyana, *Entomol. Mitt. Zool. Mus. Hamburg* 16 (2013) 101–109.
- [17] W.R. Lourenço, B. Duhem, Further considerations on the genus *Ananteris* Thorell, 1891 (Scorpiones, Buthidae) in Brazilian Amazonia and description of two new species, *Bol. Soc. Entomol. Aragonesa* 47 (2010) 33–38.
- [18] M.A. González-Sponga, *Ananteris venezuelensis* (Scorpionida, Buthidae) nueva especie de la Guayana de Venezuela, *Mem. Soc. Cien. nat. 'La Salle'* 32 (1972) 205–214.
- [19] H.L. Stahnke, Scorpion nomenclature and mensuration, *Entomol. News* 81 (1970) 297–316.
- [20] M. Vachon, Étude des caractères utilisés pour classer les familles et les genres de Scorpions (Arachnides). 1. La trichobothriotaxie en arachnologie. Sigles trichobothriaux et types de trichobothriotaxie chez les Scorpions, *Bull. Mus. natl. Hist. nat.* 140 (1974) 857–958.
- [21] M. Vachon, Études sur les scorpions, Publications de l'Institut Pasteur d'Algérie, Alger, 1952 (482 p.).
- [22] J.T. Hjelte, Anatomy and morphology, in: G.A. Polis (Ed.), *The Biology of Scorpions*, Stanford University Press, 1990, pp. 9–63.
- [23] M. Vachon, De l'utilité, en systématique, d'une nomenclature des dents des chélicères chez les Scorpions, *Bull. Mus. natl. Hist. nat.* 35 (1963) 161–166.
- [24] M. Vachon, Sur l'utilisation de la trichobothriotaxie du bras des pédipalpes des Scorpions (Arachnides) dans le classement des genres de la famille des Buthidae Simon, *C. R. Acad. Sci. Paris* 281 (1975) 1597–1599.